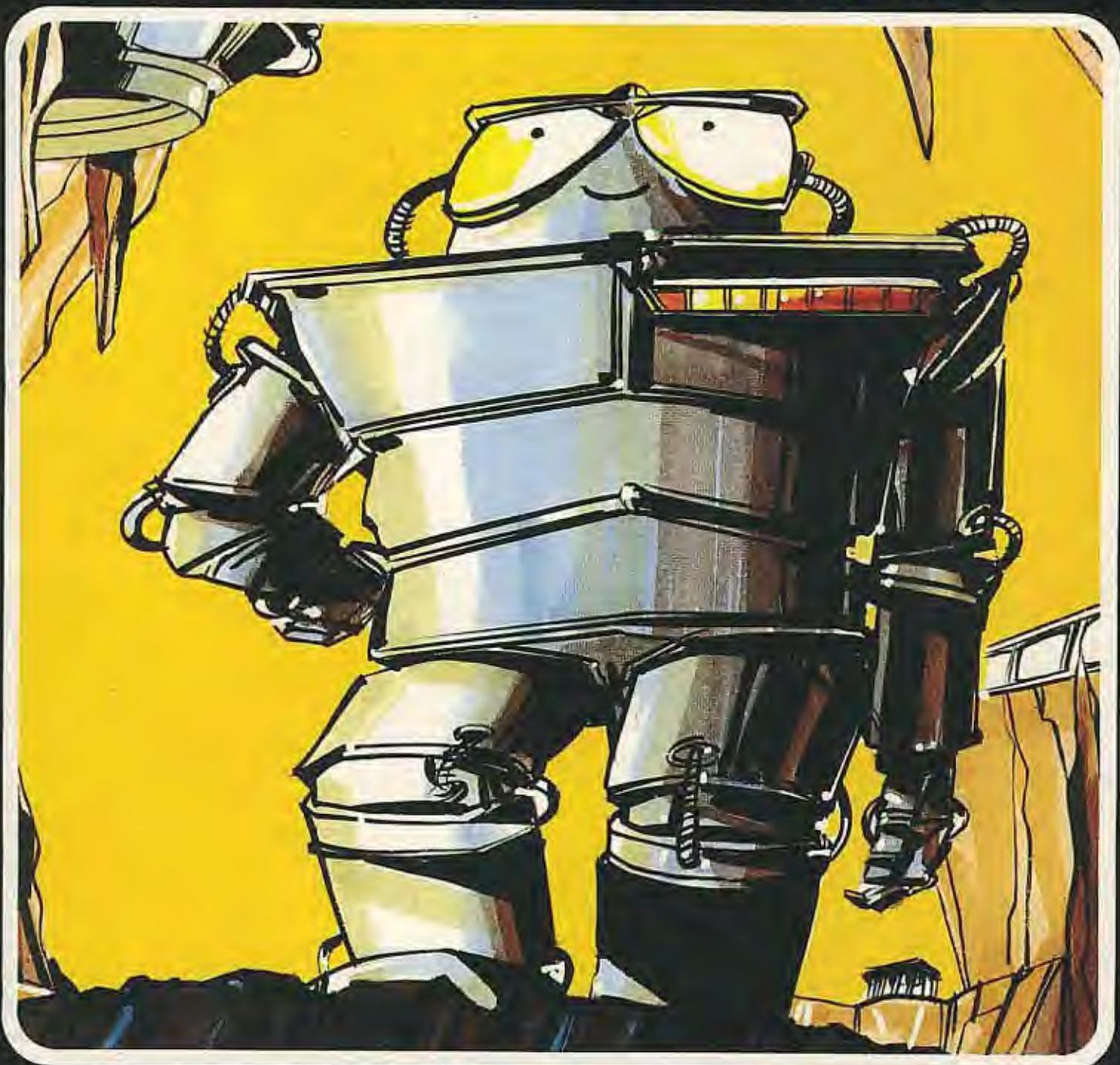
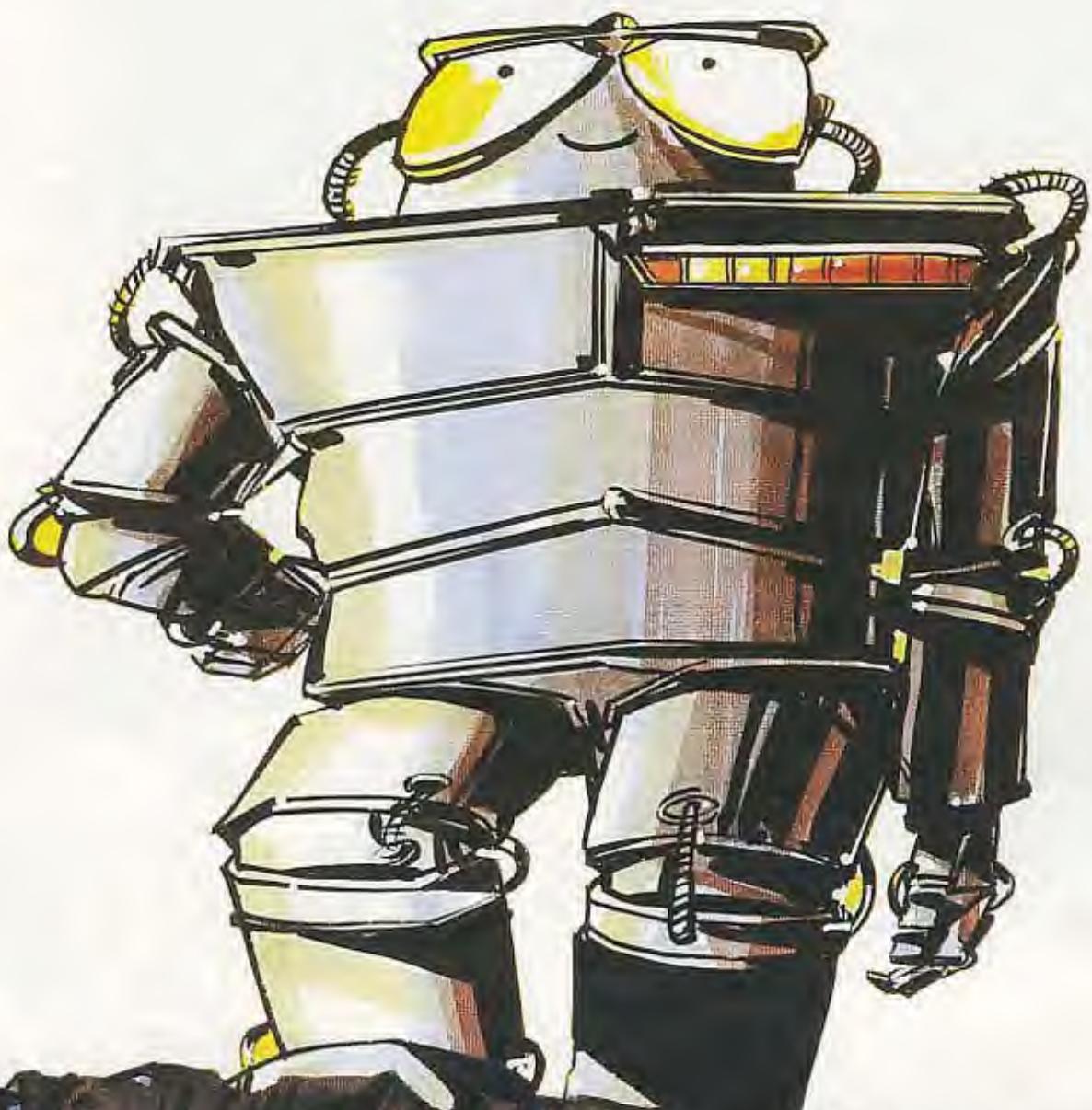


START PROGRAMMING WITH

GORTEK AND THE MICROCHIPS



 commodore
COMPUTER



START PROGRAMMING WITH

GORTEK AND THE MICROCHIPS

STORY BY

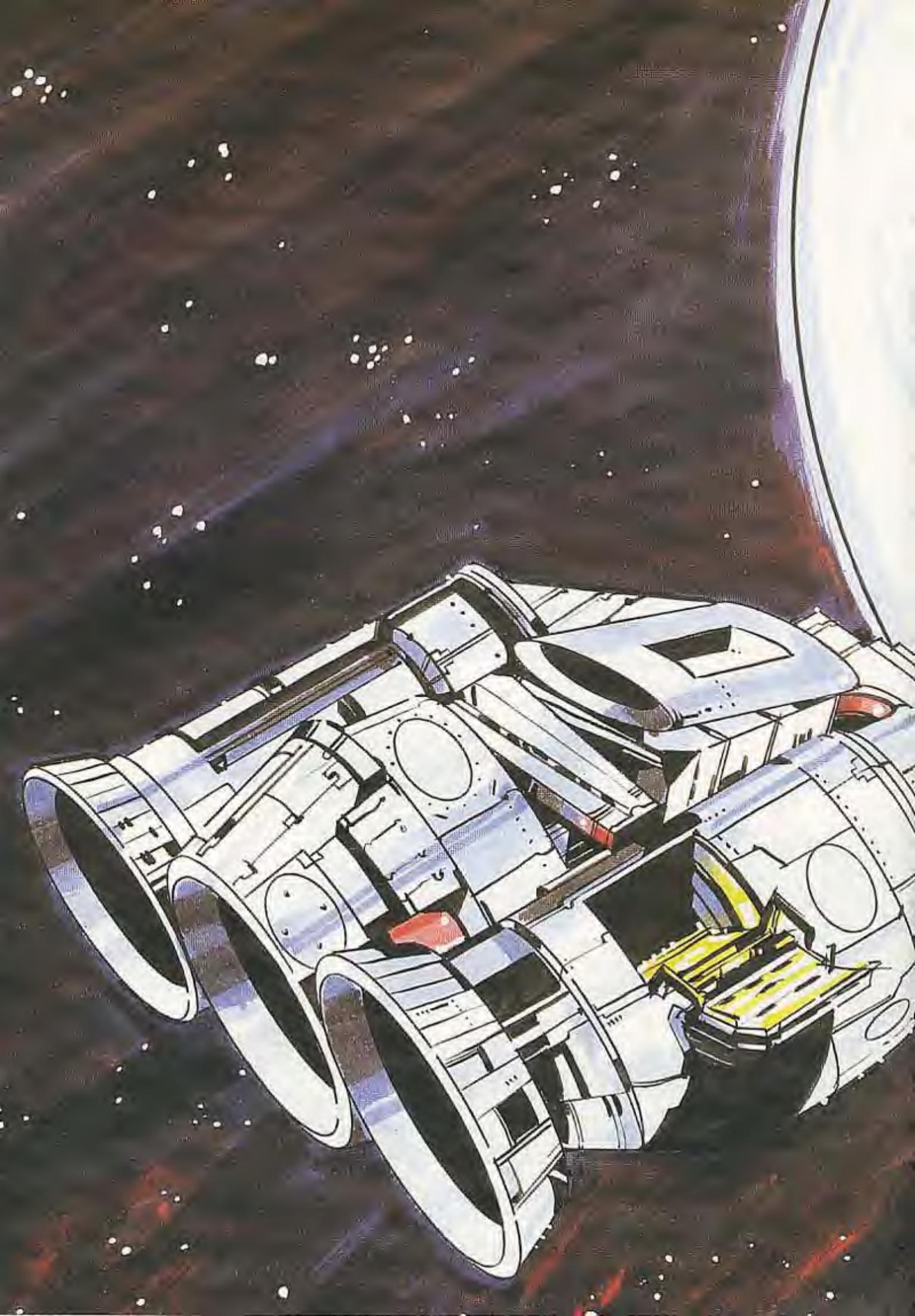
HEATHER SCOTT

PROGRAMS BY

STUART ALEXANDER

ILLUSTRATIONS CONCEIVED BY

GARY BOWIE

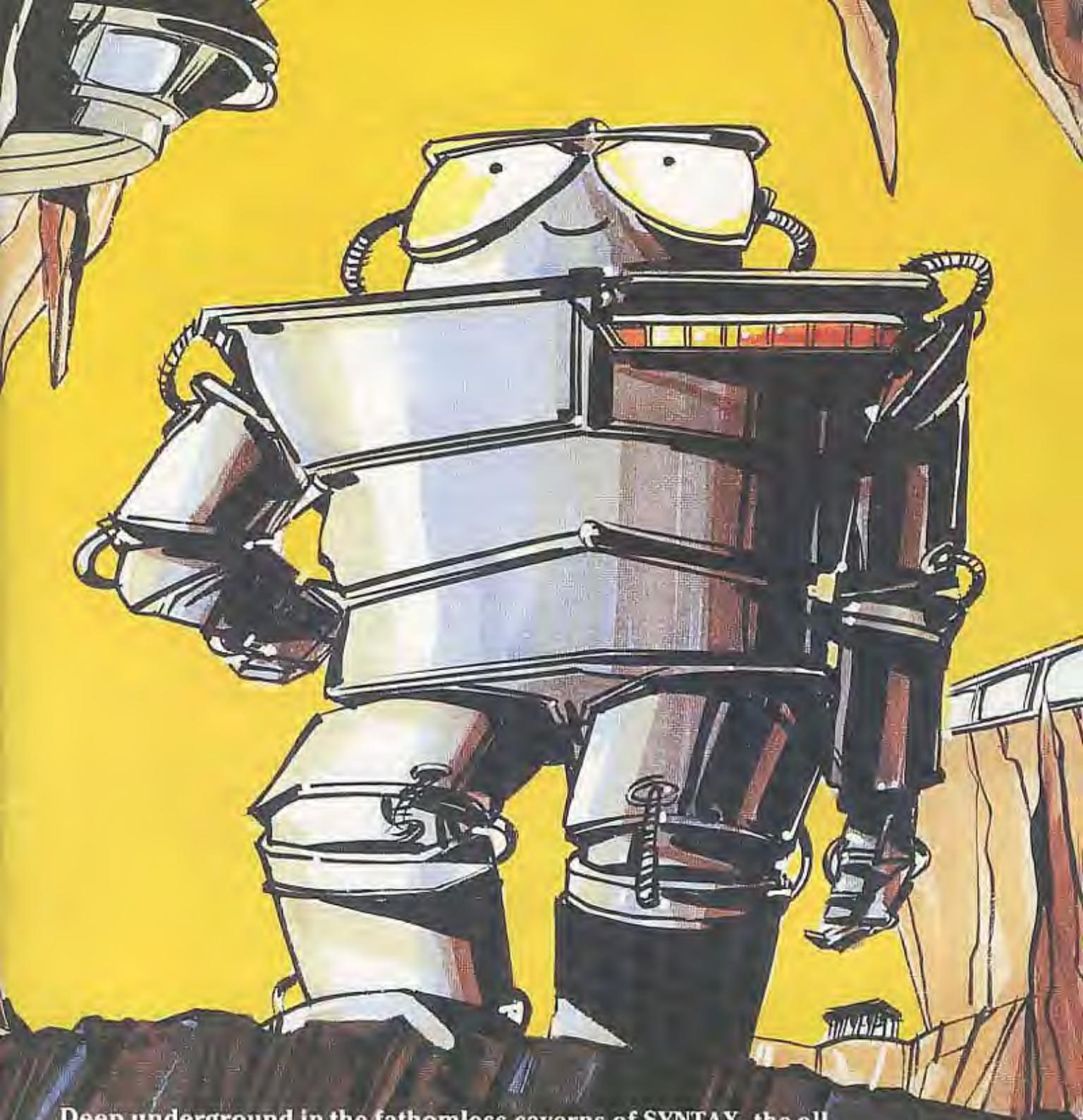


Beyond the oblivion of all numbers, far out in the galaxy and even farther, on the planet of SYNTAX, GORTEK slid wearily into his service bay.

He would have another quorum of Microchips to train when the black sky faded into the redness of the morning. The imminence of an invasion by the ZITRONS meant that time was of the essence.







Deep underground in the fathomless caverns of SYNTAX, the all powerful, all knowing, perpetual computer CREATIVITY resides. It lives on the imagination of life, fulfilling the many problems of the vast universe, protected by Gortek and the Microchips.

The Zitrons are a fearful race of creatures set upon the destruction of all planets but their own. They have discovered the whereabouts of Creativity and are now trying to confuse its data banks by bombarding the planet's surface with alien letters, and infiltrating space with mis-spelt words. Should they succeed then the whole system will crash, implode and the knowledge of all time will disappear, sucked into a devastating black hole.



News from the information systems indicates that an attack on the planet is imminent, so to help GORTEK and the Microchips in their task

- LOAD and RUN these simulation programs at your computer consoles. Urgent action is required—you will find the instructions to LOAD and RUN programs in the **MICROCHIPS MANUAL** on the next page.
- LOAD “ZITRACK” and take your instructions from the program.
Now that the alien letters have been destroyed
 - Type the word **NEW** then press the **RETURN** key.
 - LOAD “ANNIHILATION” and take your instructions from the program.

Gortek has written the Microchips Manual for his Microchips to use during their training. You will need to follow it as well.

When you have run ZITRACK and ANNIHILATION you will be ready to join the Microchips training team and carry on reading through the book.

MICROCHIPS

TO LOAD AND RUN A PROGRAM FOLLOW THESE INSTRUCTIONS:

M
A
N
U
A
L

- (1) When the computer is switched on
Type the word NEW

Then press the **RETURN** key.

- (2) Put the cassette into the tape recorder. (Make sure that all the tape is on the left-hand spool!)

- (3) Type the word LOAD "

↑ then
then type the name of the program ↑

"↑
then

- (4) Now press the **RETURN** key.

- (5) The computer will now tell you to press the PLAY button on the cassette tape recorder, so, do so!

- (6) The computer will then look for the program you want. When it finds the right one, it will say LOADING.

- (7) Wait until the computer says it is READY.

- (8) When it does say READY, type in the word RUN.

- (9) Now press the **RETURN** key.

To get the " press the shift key and at the same time the number 2

The intensity of training can be rather wearing on the circuits of the Microchips. Creativity has allowed for recreational pursuits within the work schedule.

MICROCHIPS

MANUAL

LEISURE TIME

It's time for you to take a break!

All the other microchips are playing flog at the Crater Club
... so ...

- LOAD "FLOG" into your computer now so you can enjoy the Microchip fun.
- Keep a record of your score so that when you play again you can check to see whether you have improved.

Go straight on to page 8 when you have finished playing FLOG. Now you are more familiar with the computer keyboard it is time to start your programming course.

MICROCHIPS

FLOG

Here is an example of how you might record your round. You can use a post card to make a golf card like this.

Example:

C.N.	H.S.
3	2
6	5
10	12

If the hole length is 48 metres.

Choose: C.N. 6
H.S. 5
Direction +

Then: C.N. 6
H.S. 2
Direction +

Then: C.N. 3
H.S. 2
Direction +

(Look at the card to see how this has been recorded!)

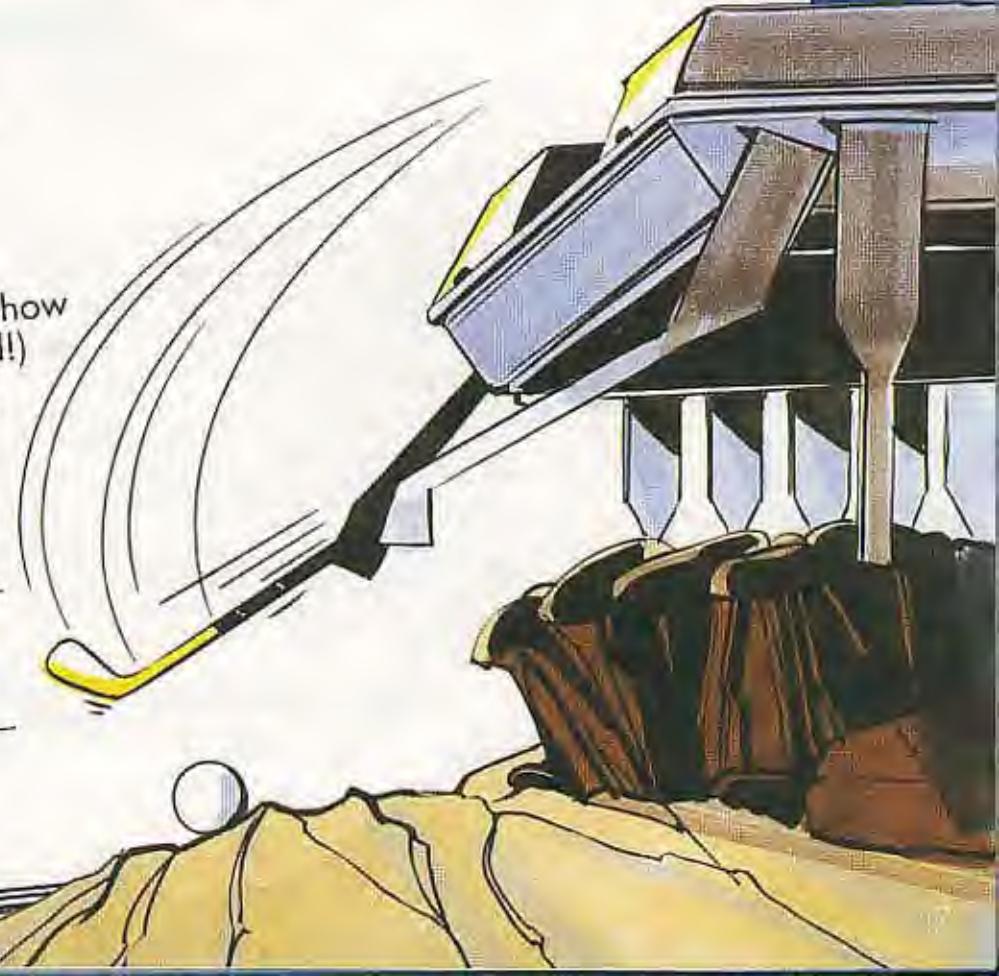
If the hole length is 44 metres.

Choose: C.N. 10
H.S. 5
Direction +

Then: C.N. 3
H.S. 2
Direction -

Hole	Length	Distances	Score
1	48m	→ 30 → 12 → 6	3
2	44m	→ 50 ← 6	2
3			
4			
5			
6			
7			
8			
9			

**M
A
N
U
A
L**



The next morning the Microchips are given vital instructions in Computer Programming. To avoid devastation when the Zitrons strike they must be competent at programming Creativity. Follow the MICROCHIP MANUAL carefully then you will also be able to program and so help Gortek in his vital task.

MICROCHIPS

PROGRAMMING

MANUAL

Every time you write a new program on the computer, type NEW and then press the **RETURN** key.

Always press the **RETURN** key when you want to enter your instruction into the computer.

Every instruction to the computer must be written on a different line.

Each line must start with its own line number. Generally, you should increment line numbers by ten (10, 20, 30...) so that there is room to insert additional lines, if required.

Always finish the program with a line number followed by the instruction END.

If you make a mistake do not press the **RETURN** key. You can rub out your mistake by pressing the **INST DEL** key until your mistake has gone, and then you need to retype your line.

Type the word LIST and then press the **RETURN** key to see a listing of your program.

Type the word RUN and then press the **RETURN** key to see your program work when you have finished it.

This will tell the computer you have finished!

That afternoon the Microchips are given their first program to try.

MICROCHIPS

MANUAL

- Switch the computer on, or type NEW.
- Type in the following program:

```
10 PRINT "XXX"  
20 PRINT "XXX"  
30 END
```

- Now type the word RUN
- Then press the **RETURN** key.

Then don't forget to press the **RETURN** key!

...All programs finish with **END**

You should now see

```
10 PRINT "XXX"  
20 PRINT "XXX"  
30 END  
RUN  
XXX  
XXX
```

This is what you have asked the computer to do!

PRINT tells the computer to print something on the screen.

If you make a mistake when you are typing in your program —

Either press the **INST DEL** key, to rub out your mistake.

Or just retype your line again.

MICROCHIPS

MANUAL

- Look at the following PRINT statements

```
PRINT"***"  
PRINT" * * "  
PRINT" * "  
PRINT" * * "  
PRINT" * "  
PRINT" * * "  
PRINT" * * "  
PRINT" "
```

- By using the above PRINT statements, and the
END

statement, write a program to print one of the letters on
the following page on to the computer screen.

```
10 PRINT"***"  
20 PRINT" * * "  
30 PRINT" * * "  
40 PRINT" * * * "  
50 END
```

Here is an example program
which when you RUN will produce
the letter *** on the screen!

```
***  
* * *  
***
```

MICROCHIPS

MANUAL

Here are the examples of what you can PRINT on the screen using the print statements shown on page 10.

```
 * *      ***   ***   ** *   ***   ***  
 * *      * *   * *   * *   * *   * *  
 * *      ***   *   * *   * *   * *  
 ***   * *   * *   * *   * *   * *  
 * *      ***   *   * *   * *   * *  
 * *      * *   * *   * *   * *   * *  
 ***   * *   * *   * *   * *   * *  
 * *      ***   *   * *   * *   * *  
 * *      * *   * *   * *   * *   * *  
 ***   * *   * *   * *   * *   * *  
 * *      ***   *   * *   * *   * *  
 * *      * *   * *   * *   * *   * *  
 ***   * *   * *   * *   * *   * *  
 * *      ***   *   * *   * *   * *  
 * *      * *   * *   * *   * *   * *  
 ***   * *   * *   * *   * *   * *
```

- Now, still using the same statements, but in a different order, write a program to print a 2 or 3 letter word going down the screen of the computer.
- If you get stuck look in the answer section of the book for an idea.
- When you have RUN your program and made sure that it works you may go on to the next page.

The Microchips have discovered a strange spherical object. They believe it may be a bomb that has been planted by the Zitrons. The sphere has a label that says

SOCCER

Many other words are on the label but they have been scrambled into disorder. Gortek must sort out the Zitron code to see if it is safe to move the sphere. Perhaps Creativity can help. Here are the words.

To get this sign
hold down the
key and
press the
key marked

SHIFT



```
PRINT "AND ";
PRINT "THE IDEA IS ";
PRINT "SOCCER IS ";
PRINT " . . . ";
PRINT "WHERE ";
PRINT "SILLY PEOPLE ";
PRINT "KICK ";
PRINT "CHASE AFTER ";
PRINT "A GAME ";
PRINT "EACH OTHER ";
PRINT "TWENTY-TWO MEN ";
PRINT "RUN AROUND ";
PRINT "A RIDICULOUS SPECTACLE ";
PRINT "THE REFEREE ";
PRINT "DRESSED IN SHORTS ";
```

You need to
leave two spaces
here!

Make sure you
leave one space
between the last
letter and the "

Do not worry if
the line you type goes
onto another line!
Only press the **RETURN** key
when you have finished
the line completely.

```
PRINT "A BALL ";
PRINT "A SPORT ";
PRINT "KICKING ";
PRINT "FOULING ";
PRINT "PASSING TO ";
PRINT "TO SCORE GOALS ";
PRINT "TO PUT ";
PRINT "KISSING ";
PRINT "IN A NET BETWEEN TWO POSTS ";
END
```



- Now type NEW and then the following program into the computer. Don't forget to press the **RETURN** key at the end of each line.

```
10 PRINT"SOCCER IS ";
20 PRINT"A GAME ";
30 PRINT" ■■ .";
40 END
```

Now run your program to see what happens.

- Write down what you think the ■■ tells the computer to do.
- Write down what you think the ; tells the computer to do.
- Help Gortek sort out the PRINT statements —

Write your own program (using the PRINT statements given) to print a meaningful sentence about football on the screen.

There is an idea for a program in the Answer Section.

- Make sure you have RUN your program before you go on to the next page.



MICROCHIPS

MANUAL

Apart from using letters and/or numbers with the PRINT statement, all the other characters on the keyboard can also be used with it.

- Find the following keys:



- Type the following program into the computer. Don't forget to press the RETURN key at the end of each line!

```
10 PRINT" ♥ ";
20 PRINT" * ";
30 PRINT" □ ";
40 PRINT" Q ";
50 PRINT" * ";
60 END
```

To get this sign
press the ***** key!

To get this sign
press the **CLR HOME** and the **SHIFT** key!

To get this sign
press the **□** key!

To get this sign
press the **Q** key!

- Type RUN and press the RETURN key.
You should see



- It's time for target practice.
LOAD "SPLAT" into your computer.
(Don't forget to type NEW and press the **RETURN** key first.)

The Zitrons' Galacraft are preparing to land. Gortek hurries the Microchips to their next lesson. They must all be ready to repel the invasion! Creativity's counterplot must be programmed and implemented before nightfall.

MICROCHIPS

- Use the following PRINT statements:

PRINT"  "

PRINT"  "

PRINT"  "

PRINT"  "

PRINT"  "

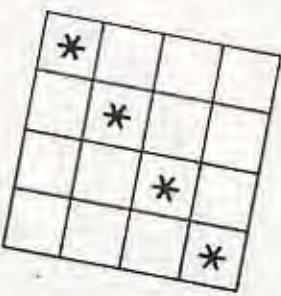
PRINT"  "

PRINT" * "

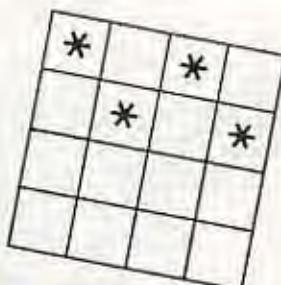
Experiment on the computer, using the keys on page 14, to get the symbols for each different PRINT statement.

and the END statement to write a program to produce one of these patterns on the computer screen.

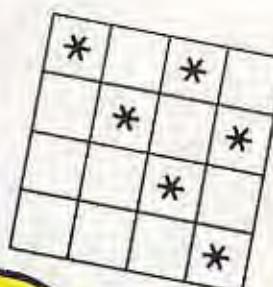
(i)



(ii)



(iii)



This is only a very small beginning - just to show you how to use some different keys with the PRINT statement. Try out your own ideas now and print what you want to on the screen!

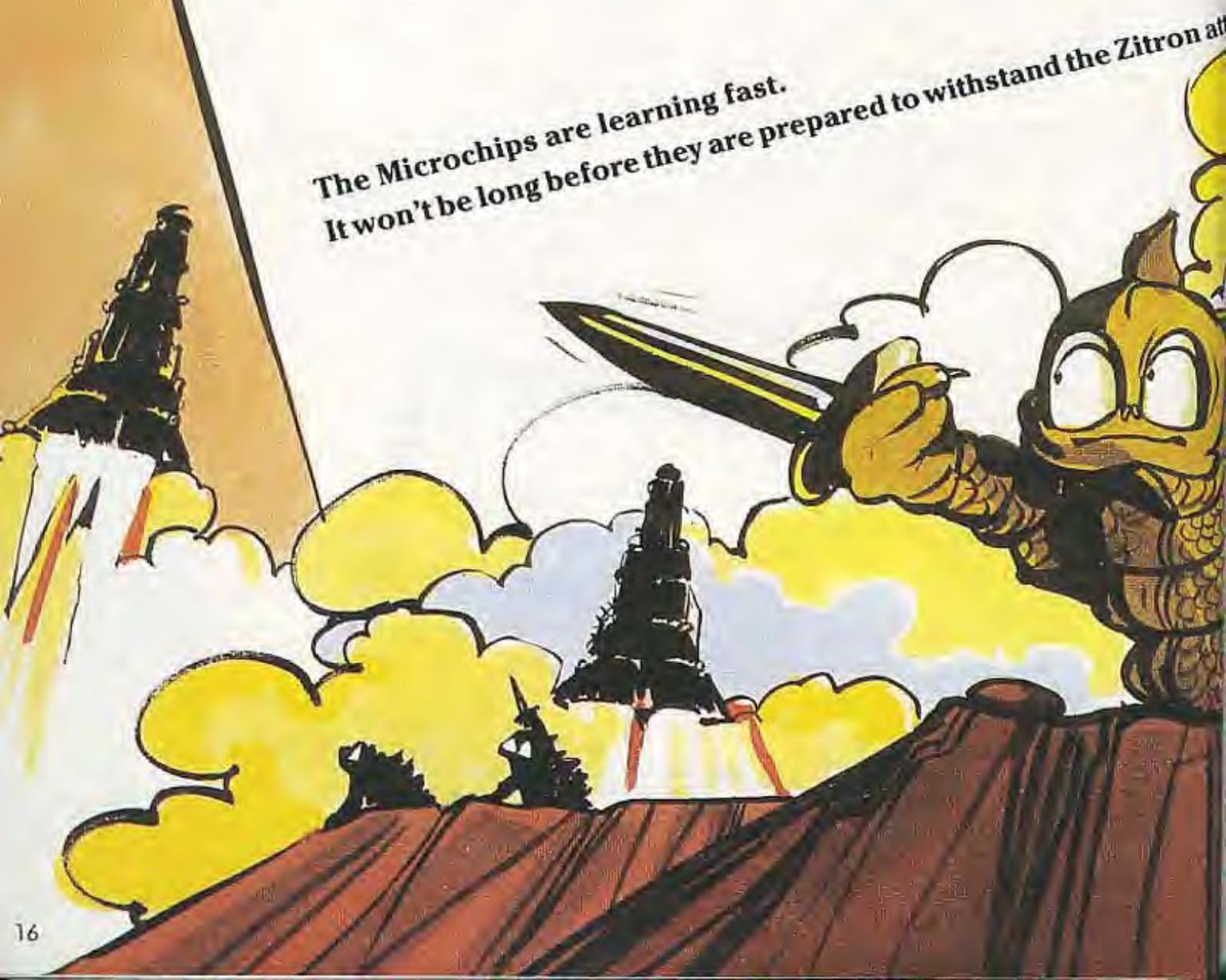
The answers to the patterns above are in the answer section.

M
A
N
U
A
L

So far the Microchips have worked with these commands

- LOAD which tells the computer to load a program.
- RUN which tells the computer to run the program which you have just loaded, or which you have just written.
- PRINT which tells the computer to print something on to the screen.
- NEW which tells the computer that you are doing something new.
- LIST which tells the computer to list the program that you have just written.

The Microchips are learning fast.
It won't be long before they are prepared to withstand the Zitron at



THE ZITRONS HAVE LANDED!



While a magnificent defence strategy is being developed by Gortek and the Microchips the Zitrons have infiltrated Syntax space and have landed at last. The situation is critical; with heavy losses on both sides, Creativity is now in imminent danger of sabotage unless the Microchips can come up with a miracle.

In the meantime training goes on . . .

Make sure that you are up to date with the schedule before you go on to the next page. . . .

MICROCHIPS

MANUAL

INFORMATION ON SYNTAX IS KEPT IN BOXES

If the Microchips want to store numbers, they put them into a box labelled with a letter.

For example, the number 5003 might be stored in a box which is labelled A.

A

If the Microchips want to store letters, words, or sentences, they must put them into a box labelled with a letter and a \$ sign.

For example, the word GORTEK might be stored in a box which is labelled A\$.

To tell the computer which box something is to be stored in the Microchips use the command LET.

For example LET A = 5003

or LET A\$ = "GORTEK"

- Now LOAD "BOXES"

A\$

MICROCHIPS

MANUAL

- Type the following program into the computer.
Do not worry if the statement runs on to 2 lines,
and only press the **RETURN** key when you have finished
a statement.

```
10 LET A$ = "THE FACTORS OF "
20 LET B$ = "ARE: "
30 LET C$ = "AND "
40 LET D$ = "||."
50 PRINT A$ ;
60 PRINT "8 ";
70 PRINT B$ ;
80 PRINT "1 ";
90 PRINT "2 ";
100 PRINT "4 ";
110 PRINT C$ ;
120 PRINT "8 ";
130 PRINT D$ ;
140 END
```

- Now **RUN** your program.
- Now **LIST** your program and then, without changing
lines 10, 20, 30 and 40, rewrite the other lines so that the
computer prints the factors of six. (To re-write a line just
type in its number again, and then the statement that
you want in its place.)
- By now you should know where to find the answers if
you get stuck!
- Run your program to see that it works.

The Microchips in the Satellite Centre have asked the trainees to help by inputting current battle data into the telemonitors. The status report of the struggle is changing every hour so when you are ready to help with this assignment.

MICROCHIPS

MANUAL

- Type NEW then after pressing the **RETURN** key
LOAD "STATUS REPORT"
- LIST this program and you should see the following:

```
10 LET A$ = "*****  
20 LET B$ = "STATUS REPORT"  
30 LET C$ = "MICROCHIP LOSSES"  
40 LET D$ = "ZITRON LOSSES"  
50 LET E$ = "STARFIGHTER LOSSES"  
60 LET F$ = "GALACRAFT LOSSES"  
70 LET G$ = "  "  
80 PRINT G$  
90 PRINT A$  
100 PRINT ""  
110 PRINT B$  
120 PRINT ""  
130 PRINT C$;  
140 PRINT " 10"  
150 PRINT ""  
160 PRINT D$;  
170 PRINT " 15"  
180 PRINT ""  
190 PRINT A$  
200 END
```

When you LIST the program you will need to slow the computer down. You can do this by pressing the key marked **CTRL**

- Now RUN the program.

You should then see the current data displayed on your screen.

MICROCHIPS

MANUAL

After you have RUN your program ...

- LIST your program and without changing all of the lines... change the rest of your program so that it will show the following on the screen (you will need to change lines 130, 140, 160 and 170 by just retyping these lines to say what you want them to say):

STATUS REPORT

STARFIGHTER LOSSES 3

GALACRAFT LOSSES 7

- Now RUN your program to see that it works.

You may also check your program with the answer in the back of the book.

Whilst the battle rages on, Gortek and the Microchips are encouraged by their army's decreasing losses. They must work extra hard the next day on the new tactics for repelling the Zitron forces.

The Computing Times is the Microchips' daily newspaper. Gortek makes sure that all of them have a look so that they can keep up with the battle news. Today there is also an important program which cannot be missed.

NOTICE

Computing Times

- Type in the following program:

```
10 LET X = 7  
20 FOR Y = 1 TO 10  
30 PRINT X * Y  
40 NEXT Y  
50 END
```

Write down the numbers that were printed on the screen. Also write down what you think the numbers are.

Write down what you think the * means. Also write down which lines told the computer to do 10 examples.

VETAK REPELS ATTACK FORCE

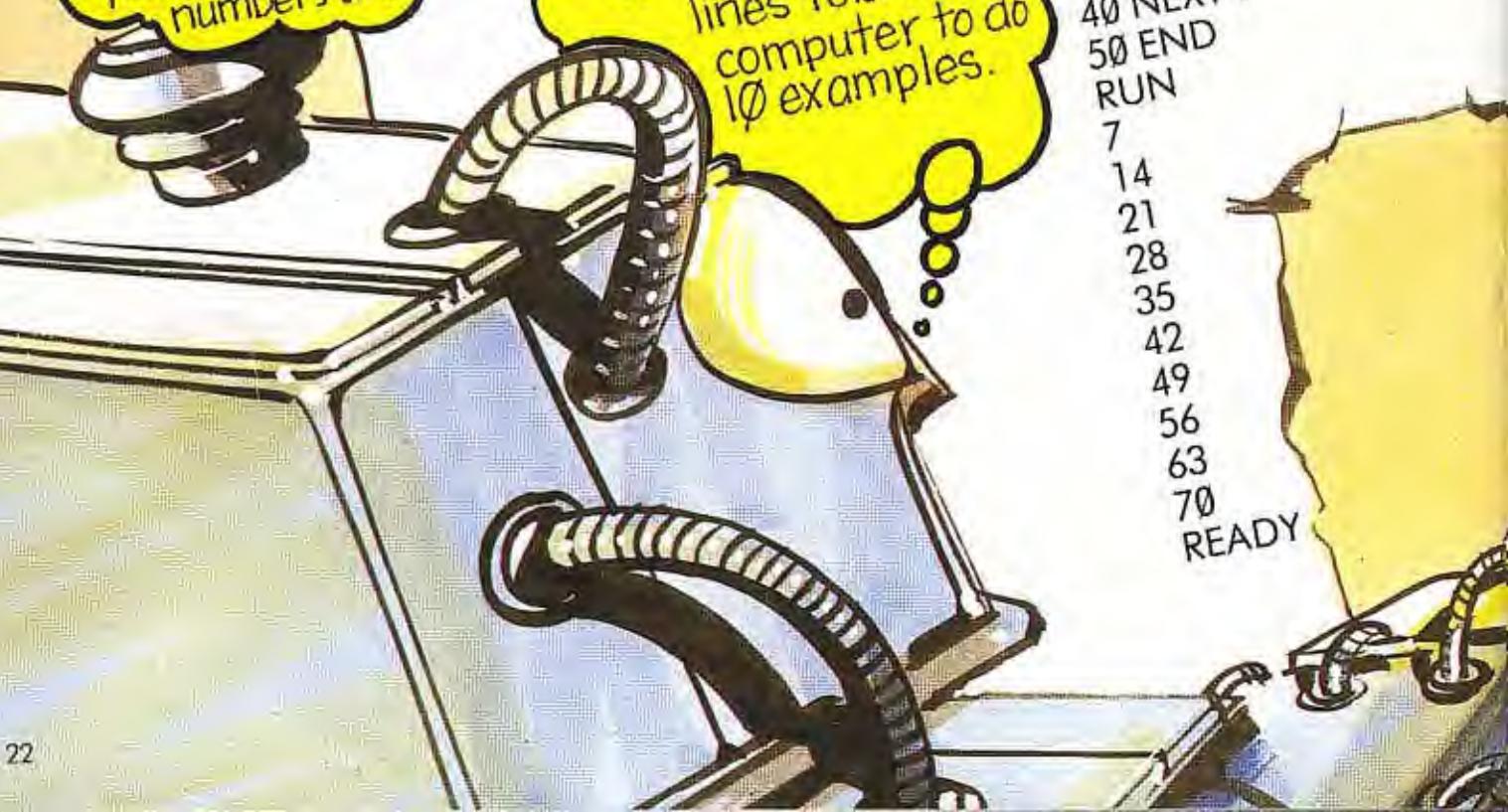
The Zitrons suffered heavy losses at Zoar, west of the main city complex, yesterday. They retreated in the face of the valiant Microchips who were led by Preceptor Vetak. No further attacks are expected in that zone.

Reinforcements could strengthen the Zitron positions and an imminent assault on CREATIVITY is still feared.

- Now RUN your program. On the screen you should now see:

```
10 LET X = 7  
20 FOR Y = 1 TO 10  
30 PRINT X * Y  
40 NEXT Y  
50 END  
RUN
```

7
14
21
28
35
42
49
56
63
70
READY



So — keep in the picture, too; read this extract carefully and carry out all the instructions.

BOARD

- Here are two more programs:

i) 10 LET X = 9
20 FOR Y = 1 TO 20
30 PRINT X * Y
40 NEXT Y
50 END

ii) 10 LET X = 139
20 FOR Y = 1 TO 15
30 PRINT X * Y
40 NEXT Y
50 END

- Write down what you think each of them does.
- Write a program to print the answers to the 14 times table, from 1×14 to 12×14 , on the screen.

Type your program into the computer and then RUN it to see that it works.

- Write a program to print the 234 times table out fully, from 234×1 to 234×10 on the screen.

Type your program into the computer and then RUN it to see that it works.

You will need to use this line:

PRINT X;" * ";Y;" = ";X * Y

in place of the other line 30.

Choose one of the programs to type in and then RUN the program to see that it works.



FOR SALE

ROBOT DOG — One well trained robot dog. Needs oil change and new wiring. Answers to "ROVER". Plays chess well. Signal Astro 8900 for details.

Computer art is an important feature of Syntax life and one which is not being omitted from the training schedule. The Zitrons have never been in an artistic world and Creativity is relying on surprise strategy as an intricate part of the counterplot. Imaginative ingenuity will surely enhance the Microchips' chances of success. Gortek uses straightforward patterns to instruct the Microchips in the techniques of design.

MICROCHIPS

MANUAL

- LOAD "COMPUTER ART"

A black and white photograph of a GORE-TEX garment, likely a jacket or coat. The brand name 'GORE-TEX' is printed in a repeating pattern of asterisks (*). The pattern is oriented diagonally, creating a textured, almost camouflage-like effect. The word 'GORE' is on the top line and 'TEX' is on the bottom line of each asterisk cluster. The garment has a visible zipper and a small label with the word 'READY' on it.

20 column
screen

40 column screen

- RUN the program and you should see the above patterns appear on the screen.
- LIST the program and make a note of the line statements.

MICROCHIPS

MANUAL

- Write a program to produce this pattern on the screen.

A screenshot from the TRON game. The player's ship, a small white square with a red and blue striped pattern, is positioned in the lower-left quadrant of the screen. It is facing towards the upper-right. The background is a vast, glowing blue space filled with a complex, glowing grid of lines and shapes. The grid consists of numerous glowing blue lines that form a three-dimensional structure, resembling a wireframe cube or a complex network. The lines are thick and bright, creating a sense of depth and motion. The overall atmosphere is futuristic and minimalist, characteristic of the TRON aesthetic. The word "READY." is visible at the bottom of the screen, indicating the player is about to start the game.

20 column screen

READY.

40 column screen

Use the following statements to help you! They are all muddled up and you will need to put them in the right order.

```
END  
FOR T = 1 TO 20  
NEXT T  
PRINT "ZITRON # # ZITRON # # ZITRON";
```

- Now, use your skill to write a program which will produce your own original computer art on the screen.

MICROCHIPS MANUAL

MULTIPLE PATTERNS

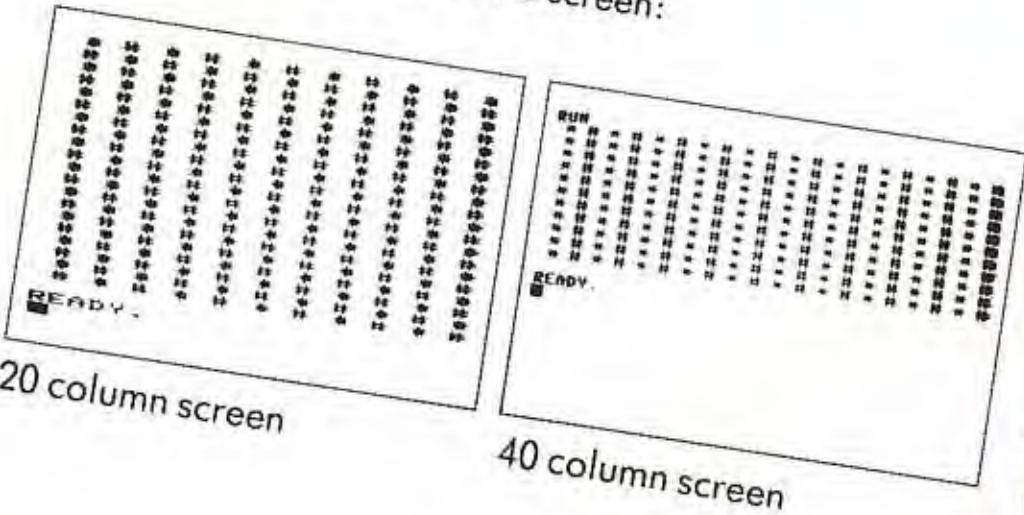
- Type in the following program:

```
10 FOR T = 1 TO 110
20 PRINT "* # ";
30 NEXT T
40 END
```

Make sure you
leave one space!

- Now RUN your program.

You should see this on the screen:



- Now write a program to print something in every 3rd space on the screen.

Gortek also teaches the Microchips to program the computer so that it is friendly. A smile generates a smile and hopefully if the Zitrons do reach Creativity the aura and friendliness of this amazing computer will allay immediate devastation and give the Microchips time to regroup.

MICROCHIPS

MANUAL

- LOAD "CONVERSATION 1" and then RUN it.
Then after typing NEW and pressing the **RETURN** key...

- LOAD "CONVERSATION 2"

- Now LIST the program and you should see this (read through the listing carefully):

```
10 PRINT "HELLO - "
20 PRINT "WHAT IS YOUR NAME?"
30 INPUT A$
40 PRINT " "
50 PRINT "HELLO AGAIN"
60 PRINT A$
70 PRINT "I AM PLEASED"
80 PRINT "TO MEET YOU"
90 PRINT " "
100 PRINT "HOW OLD ARE YOU?"
110 INPUT B$
120 PRINT B$; " THAT'S A BIT"
130 PRINT "YOUNG TO START"
140 PRINT "TO PROGRAM ME"
150 PRINT A$;" "
```

- Now RUN the program to see how it works.

- Now continue the above program so that it asks the following question and then prints a sensible reply.

"What is your favourite lesson at school?"

- RUN your program to see that it works.

Make sure you leave spaces in the right places when you type in your lines.

The Microchips are having a hard fight. A Zitron scouting party has discovered the entrance to the inner sanctum of Syntax and a fierce assault on the entrance has begun. The Microchips have moved into the very caverns where Creativity lives so they can continue their work.

MICROCHIPS

MANUAL

- Type the following program into the computer:

```
10 PRINT ""  
20 PRINT "LET ME SHOW YOU"  
30 PRINT "HOW CLEVER I AM."  
40 PRINT ""  
50 PRINT "I CAN ADD TOGETHER"  
60 PRINT "ANY TWO NUMBERS THAT"  
70 PRINT "YOU GIVE ME IN A"  
80 PRINT "SUPERFAST TIME."  
90 FOR T = 1 TO 5  
100 PRINT ""  
110 PRINT "TYPE IN"  
120 PRINT "YOUR FIRST NUMBER."  
130 INPUT A  
140 PRINT ""  
150 PRINT "NOW TYPE IN"  
160 PRINT "YOUR SECOND NUMBER"  
170 INPUT B  
180 PRINT "THE ANSWER IS -"  
190 PRINT A + B  
200 NEXT T  
210 END
```

- Now RUN the program.

- Rewrite line 90 so that the computer will give you 10 goes. Then RUN your program to see that it works.

These lines tell the computer to give you 5 goes.

MICROCHIPS

MANUAL

- Choose one of the following ideas:

(Remember to make the computer as friendly as possible when you are writing your program!)

1. Write a program to take away one number from another.
2. Write a program to multiply two numbers together.
3. Write a program to divide one number into another.

PRACTICE USING

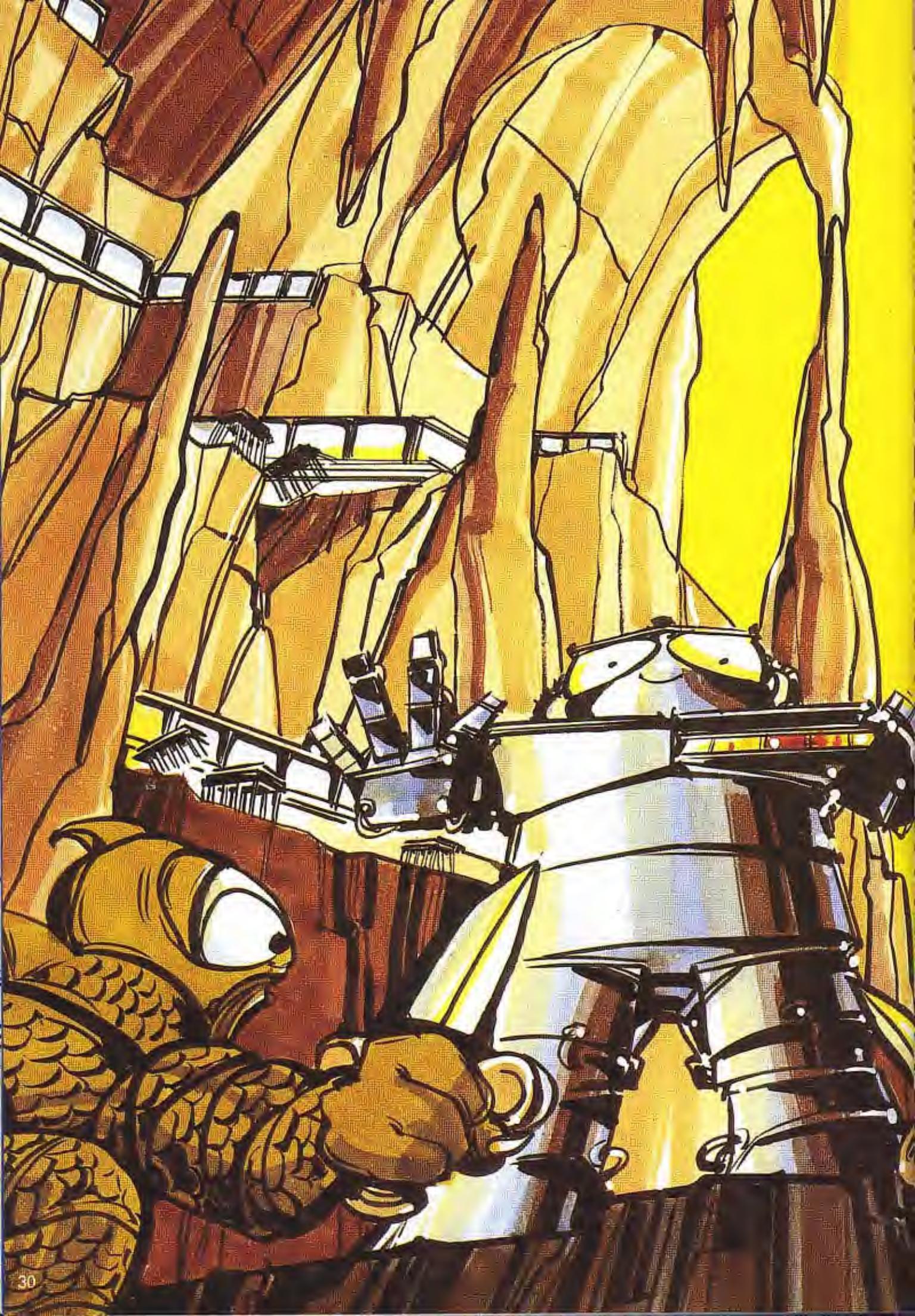
'+' ' - ' 'x' and ' ÷ '

Remember that the 'add' and 'take' signs on the computer are the same. The multiply and divide signs are not—

the * means multiply

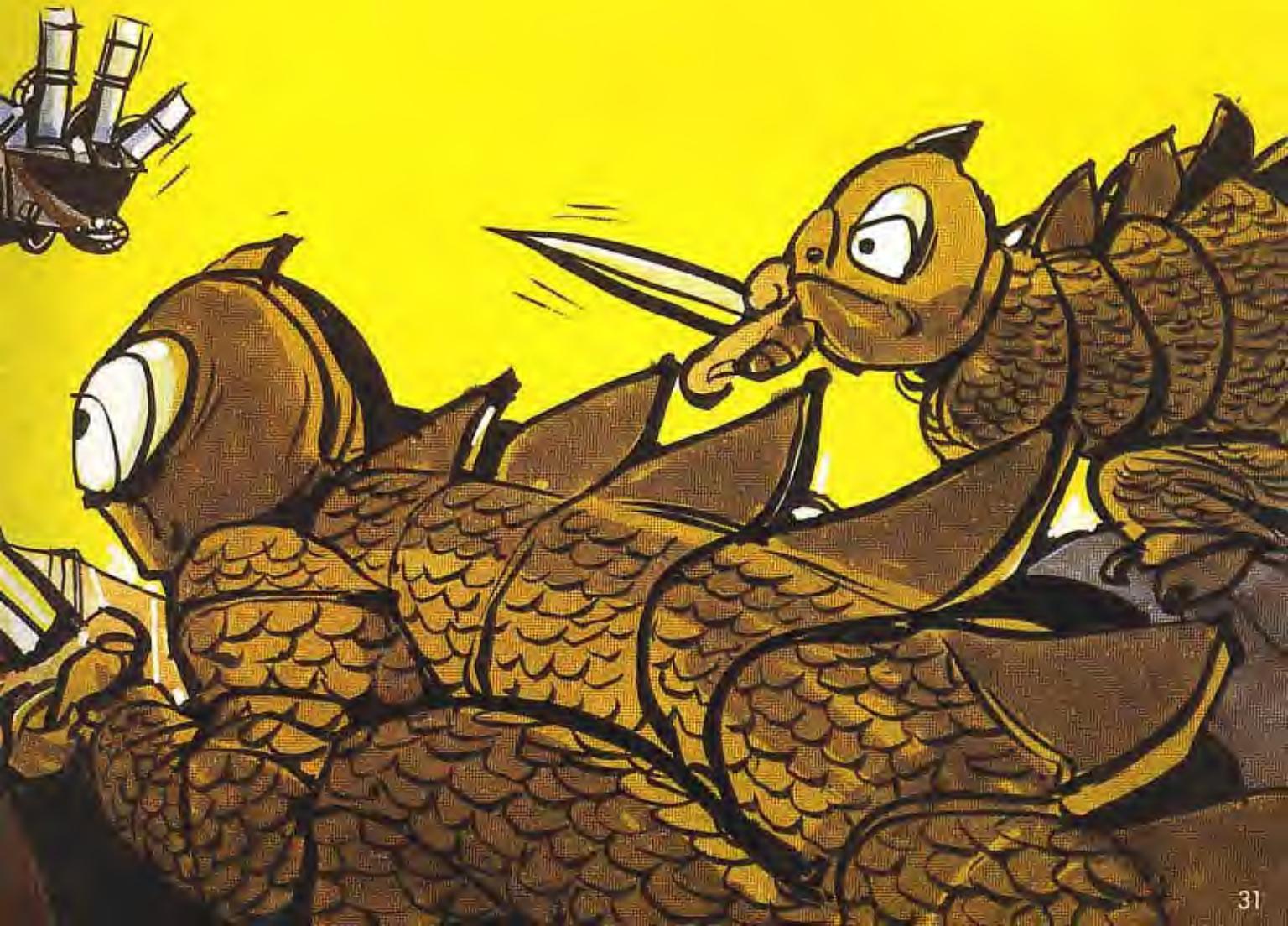
the / means divide

TIME FOR A
BREAK! Gortek thinks
that you have worked hard up
to this point so LOAD "PV" before going
on to the next section.



The might of the Zitron army has landed. With seemingly little regard for the purposes of Creativity they have set upon their task of ultimate destruction. A few of the Zitrons have infiltrated the inner sanctum on Syntax and are intent on eliminating the all knowing computer. On their path of evil they have been halted by a flashing computer screen. Their inquisitive nature has overcome their evil intents . . . is it possible that there might be better things in life?

The flashing cursor has mesmerised them all. Violent intent gone from their minds, they are intrigued by the program on the screen. Each Zitron is clamouring to try it out for himself.



MICROCHIPS

MANUAL

LOAD "MICROQUIZ" and RUN the program. You will need to help the Zitrons to answer the questions to keep them from remembering their task of destruction.

Here is another program that one of the Microchips wrote to test his friends at Anagrams.

Type it into your computer:

```
10 PRINT "WHAT IS THIS WORD -"  
20 PRINT ""  
30 PRINT "SIBAC"  
40 INPUT A$  
50 IF A$ = "BASIC" THEN 70  
60 GOTO 10  
70 PRINT "CORRECT"  
80 END
```

- Now RUN the program.
- To see how lines 50, 60 and 70 work run the program and make sure you deliberately type in the wrong answer to the computer's question.

That program only tests one anagram.

- Now, by writing some more lines to this program, test these three anagrams as well. You must try to keep the Zitrons occupied for as much time as possible!

REKGOT

SIPCH

NITROZ

Lines 10 to 80
were the other
LET statements.
DON'T
FORGET THEM!

Meanwhile more and more

Zitrons are pouring into the caverns as word

is passed around about the marvellous computer they have found.

The Microchips are furiously writing new programs as part of the plan to keep the Zitrons occupied.

MICROCHIPS

- Using the following statements — write a program which tests your knowledge of the times tables;

```
LET A = 1
LET B = 2
LET C = 3
LET D = 4
LET E = 5
LET F = 6
LET G = 7
LET H = 8
LET I = 9
LET J = 10
```

```
PRINT "WHAT IS THE ANSWER"
PRINT "TO THIS SUM?"
```

```
INPUT Z
PRINT ""
PRINT ";*"; "=";
IF Z = * THEN
PRINT "NO - TRY AGAIN!"
GOTO
END
```

Here is part of another Microchip's program:

```
100 LET J = 10
110 PRINT "WHAT IS THE ANSWER"
120 PRINT "TO THIS SUM?"
130 PRINT ""
140 PRINT A; "*"; B; "=";
150 INPUT Z
160 IF Z = A * B THEN 190
170 PRINT "NO - TRY AGAIN!"
180 GOTO 140
190 PRINT "WHAT IS THE ANSWER"
200 PRINT "TO THIS SUM?"
```

You will need to fill in the gaps in some of the statements like they have been filled in here!

**M
A
N
U
A
L**

The last two pages of the **MICROCHIPS MANUAL** have two exercises to test the Microchips' knowledge of programming. The more knowledge they have gained, the better are their chances of capturing the Zitrons' interest and neutralizing their attack for good.

MICROCHIPS

MANUAL

ODD-ONE-OUT

This is an idea for a program which can be developed further at a later stage.

- Write a program which tests your ability to spot the odd-one-out! Choose your line statements from the ones listed below:

```
PRINT "CAR HOUSE BICYCLE"  
PRINT "ELEPHANT LION SNAKE"  
PRINT "HOE RAKE CHISEL"  
PRINT "FIND THE ODD ONE OUT:  
PRINT "  "  
PRINT "TYPE IN YOUR ANSWER - ";  
INPUT A$  
IF A$ = "HOUSE" THEN  
IF A$ = "SNAKE" THEN  
IF A$ = "CHISEL" THEN  
GOTO   
PRINT "CORRECT"  
PRINT "TRY AGAIN!"  
PRINT "DO YOU WANT ANOTHER"  
INPUT B$  
IF B$ = "YES" THEN  
IF B$ = "NO" THEN  
PRINT "  
PRINT "QUESTION?"
```

Remember
you need to type
in a line number
after typing GOTO
or THEN

- If you are not sure how to get started on this program look in the answer section for an idea.

MICROCHIPS

AREA OF A RECTANGLE

- Write a program to give you the Area and the Perimeter of a rectangle if you type in its length and width.

Choose your line statements from the ones listed below:

```
IF Z$ = "NO" THEN
IF Z$ = "YES" THEN
INPUT A
INPUT Z$
INPUT B
PRINT A * B
PRINT "ENTER LENGTH - "
PRINT "TO FIND THE AREA"
PRINT ""
PRINT "AREA = ";
PRINT "AREA OF A RECTANGLE"
PRINT "TYPE IN WIDTH - "
PRINT "OF A RECTANGLE"
PRINT "ENTER WIDTH"
PRINT 2 * (A+B)
PRINT "ANOTHER QUESTION?"
PRINT " "
PRINT "TYPE IN LENGTH - "
PRINT "PERIMETER = ";
PRINT "AND PERIMETER"
PRINT " = LENGTH * WIDTH"
PRINT "2 * (LENGTH + WIDTH)"
GOTO
```

- If you are not sure how to get started on this program look in the answer section for an idea!

MANUAL



The Zitrons start to wonder. . . .

Perhaps there is something better in life than destruction. Hoards of Zitrons have swarmed into the caverns, not to destroy . . . but to play and to learn at the computer consoles.

Microchips are caught up in their enthusiasm and are running everywhere teaching the happy Zitrons to load computer games and to write computer programs. Creativity has triumphed yet again. As Gortek has been saying all along — COMPUTING IS FUN. Don't you agree?



ANSWERS

Here are the answers to the exercises in the book. The "listings" of the programs have been prepared using a printer connected to the computer. It is called a "dot matrix printer" because the letters, numbers and shapes are made up of tiny dots.

PAGE 10

```
10 PRINT "*** "
20 PRINT "* *"
30 PRINT "* *"
40 PRINT "* *"
50 PRINT "*** "
60 END
```

PAGE 11

```
10 PRINT "* *"
20 PRINT "* *"
30 PRINT "***"
40 PRINT "* *"
50 PRINT "* *"
60 PRINT " "
70 PRINT "***"
80 PRINT " * "
90 PRINT " * "
100 PRINT " * "
110 PRINT "***"
120 END
```

PAGE 13

The  tells the computer to move back one space.

The ; tells the computer to wait where it is.

```
10 PRINT "SOCCER IS ";
20 PRINT "A GAME ";
30 PRINT "WHERE ";
40 PRINT "TWENTY-TWO MEN ";
45 PRINT "
50 PRINT "RUN AROUND ";
60 PRINT "DRESSED IN SHORTS ";
70 PRINT "KICKING ";
75 PRINT "
80 PRINT "A BALL ";
90 PRINT "!!. ";
100 END
```

PAGE 15

i)

```
10 PRINT "D";
20 PRINT "*";
30 PRINT "B";
40 PRINT "*";
50 PRINT "C";
60 PRINT "*";
70 PRINT "D";
80 PRINT "*";
90 END
```

This tells the computer to move down one space!

ii)

```
10 PRINT "D";
20 PRINT "*";
30 PRINT "B";
40 PRINT "*";
50 PRINT "D";
60 PRINT "*";
70 PRINT "B";
80 PRINT "*";
90 END
```

This tells the computer to move up one space!

iii)

```
10 PRINT "D";
20 PRINT "*";
30 PRINT "B";
40 PRINT "*";
50 PRINT "D";
60 PRINT "*";
70 PRINT "B";
80 PRINT "*";
90 PRINT "B";
100 PRINT "III";
110 PRINT "*";
120 PRINT "B";
130 PRINT "*";
140 END
```

Because there are two  this tells the computer to move two spaces! Use the key  with the 

PAGE 19

Only type in the following line changes to the program:

```
60 PRINT "6 ";
100 PRINT "3 ";
120 PRINT "6 ";
```

PAGE 21

Only type in the following line changes to this program:

```
130 PRINT E$;  
140 PRINT" 3"  
160 PRINT F$;  
170 PRINT" ?"
```

PAGE 22

The numbers are the 7 times table.

The * means 'times'.

Line 20 FOR Y = 1 TO 10
and Line 40 NEXT Y
told the computer to do 10 examples.

PAGE 23

- i) This program told the computer to write down the answers to the 9 times table, from 9×1 to 9×20 .
- ii) This program told the computer to write down the answers to the 139 times table, from 139×1 to 139×15 .

```
10 LET X = 14  
20 FOR Y = 1 TO 12  
30 PRINT X * Y  
40 NEXT Y  
50 END
```

```
10 LET X = 234  
20 FOR Y = 1 TO 10  
30 PRINT X;"*";Y;"=";X*Y  
40 NEXT Y  
50 END
```

PAGE 24

```
10 FOR T = 1 TO 33  
20 PRINT "GORTEK*****";  
30 NEXT T  
40 END
```

PAGE 25

The right order of the program is:

```
10 FOR T = 1 TO 20  
20 PRINT"ZITRON##ZITRON##ZITRON";  
30 NEXT T  
40 END
```

PAGE 26

```
160 PRINT" "  
170 PRINT"WHAT IS YOUR"  
180 PRINT"FAVOURITE LESSON"  
190 PRINT "AT SCHOOL ?"  
200 INPUT C$  
210 PRINT"THAT'S GOOD -"  
220 PRINT"I LIKE "; C$  
230 PRINT"BEST AS WELL."  
240 END
```

PAGE 27

```
10 FOR T = 1 TO 150  
20 PRINT " *";  
30 NEXT T  
40 END
```

PAGE 28

```
90 FOR T = 1 TO 10
```

PAGE 29

A program to multiply two numbers together.

```
10 PRINT" "  
20 PRINT"IF YOU WANT TO SEE"  
30 PRINT"HOW CLEVER I AM -"  
40 PRINT"GIVE ME ANY TWO"  
50 PRINT"NUMBERS AND I WILL"  
60 PRINT"MULTIPLY THEM"  
70 PRINT"TOGETHER AS FAST "  
80 PRINT"AS YOU CAN BLINK!"  
90 FOR L = 1 TO 20  
100 PRINT" "  
110 PRINT"TYPE IN"  
120 PRINT"YOUR FIRST NUMBER."  
130 INPUT A  
140 PRINT"NOW THE SECOND -"  
150 INPUT B  
160 PRINT"THAT'S EASY -"  
170 PRINT"THE ANSWER IS ..."  
180 PRINT A*B  
190 NEXT L  
200 END
```

This program gives you 20 goes.

PAGE 32

```
80 PRINT "WHAT IS THIS WORD -"
90 PRINT ""
100 PRINT "REKGOT"
110 INPUT B$
120 IF B$ = "GORTEK" THEN 140
130 GOTO 80
140 PRINT "CORRECT"
150 PRINT "WHAT IS THIS WORD -"
160 PRINT ""
170 PRINT "SIPCH"
180 INPUT C$
190 IF C$ = "CHIPS" THEN 210
200 GOTO 150
210 PRINT "CORRECT"
220 PRINT "WHAT IS THIS WORD -"
230 PRINT ""
240 PRINT "NITROZ"
250 INPUT D$
260 IF D$ = "ZITRON" THEN 280
270 GOTO 220
280 PRINT "CORRECT"
290 PRINT "THANKS FOR THE GAME!"
300 END
```

PAGE 35

```
10 PRINT "2"
20 PRINT "TO FIND THE AREA"
30 PRINT "AND PERIMETER"
40 PRINT "OF A RECTANGLE"
50 PRINT ""
60 PRINT "TYPE IN LENGTH -"
70 INPUT A
80 PRINT "TYPE IN WIDTH -"
90 INPUT B
95 PRINT ""
100 PRINT "AREA OF A RECTANGLE"
110 PRINT " = LENGTH * WIDTH"
120 PRINT "AREA = ";
130 PRINT A * B
141 PRINT "AND PERIMETER"
142 PRINT " 2 * (LENGTH + WIDTH)"
143 PRINT "PERIMETER = ";
144 PRINT 2 * (A+B)
145 PRINT ""
150 PRINT "ANOTHER QUESTION?"
160 INPUT Z$
170 IF Z$ = "YES" THEN 20
180 IF Z$ = "NO" THEN 280
190 GOTO 150
200 END
```

PAGE 34

```
10 PRINT "FIND THE ODD ONE OUT -"
20 PRINT "CAR HOUSE BICYCLE"
30 PRINT ""
40 PRINT "TYPE IN YOUR ANSWER -"
50 INPUT C$
60 IF C$ = "HOUSE" THEN 90
70 PRINT "TRY AGAIN!"
80 GOTO 10
90 PRINT "CORRECT"
100 PRINT "DO YOU WANT ANOTHER"
110 PRINT "QUESTION?"
120 INPUT B$
130 IF B$ = "NO" THEN 360
140 PRINT "FIND THE ODD ONE OUT -"
150 PRINT "HOE RAKE CHISEL"
160 PRINT ""
170 PRINT "TYPE IN YOUR ANSWER -"
180 INPUT A$
190
360 END
```


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